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(54) **Total anatomic hip prosthesis**

Total anatomische Hüftgelenkprothese

Prothèse d'hanche anatomique totale

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Description

BACKGROUND OF THE DESCRIPTION

[0001] The present invention concerns a total anatomic hip prosthesis with a pressure fitting system to use for the rehabilitation of persons who have not invasive pathologies which require the hip head removal.

[0002] Said prosthesis is anatomic because it can restore, without relevant alterations, the natural and functional features of the hip.

[0003] In general terms, the present implantology coxofemoral method is based on an exclusive physical principle, namely that of the "lever", in contrast with natural laws ruling the human physiologic procedure.

[0004] Some changes have been introduced into the present prosthetic elements, such as new alloys, ceramic or hydroxyapatite coatings (HA), bio-glasses, porous layers, alveolations, the boxing of acetabular jacket or the introduction of new osteocompatible or osteoconducting substances; however, said changes could not avoid the implant failure.

[0005] In fact, localized pain, incorrect deambulation, mobility of prosthetic acetabulum and of the shaft fixed in the diaphyseal duct, fragmentation of acrylic cement, perimplantar osteolysis with evident reabsorption of the endostal bone and of the cortical diaphysal bone as well as other implant pathologies are still present. Besides. during the operation, fractures in the region of the little trochanter and of the diaphysial spiral may occur, with the following recourse to wiring.

[0006] Therefore, the main cause of failure and of implant pathologies is clearly of mechanical nature, mainly due to morphological and functional features which are unsuitable for use.

[0007] Now it is the object of the present invention a total anatomic hip prosthesis provided with morphological and functional features which can avoid the aforesaid obstacles, as well as further problems.

SUMMARY OF THE INVENTION

[0008] The total anatomic hip prosthesis according to the present invention includes a hemispherical acetabulum placed above a hemispherical cap such a prosthesis is known from document FR-A-1 538 101. The invention is charaterized by both the acetabulum and the cap being provided with anchorage means fitting by pressure the acetabulum in the iliac fossa and, respectively, the cap on femoral head, said cap being linked to the components that hold it permanently on said femoral head.

[0009] The means of primary anchorage of acetabulum in the iliac fossa are advantageously composed by a plurality of harpoon-shaped teeth working as stabilizers, which are disposed on the external surface of said acetabulum; furthermore, on the aforesaid external surface there are some knurlings which represent a secondary biological anchorage to the iliac fossa. The means of anchorage of the cap to the femoral head are also advantageously constituted by a notching which is placed on the reference plane of said cap.

[0010] According to the present invention, a possible embodiment of the prosthesis is due to the fact that the means of anchorage of the acetabulum in the iliac fossa consists of a stabilizing ring, which can be interrupted, if necessary, and which is provided with hooks on the external circumference, said ring being linked to said acetabulum.

[0011] Said link actually consists of cavities with an inclined plane present in the inner surface of the ring, allowing the fitting and the passage of radial projections on the external surface of the acetabulum. wherein the rotation of the acetabulum produces the aforesaid link.

[0012] This and other features, as well as the advantages of the total anatomic hip prosthesis according to the present invention, will be more particularly shown in the following detailed description of a non-limiting embodiment with reference to the enclosed figures.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013]

Figure 1 shows an enlarged and partially cross-sectional view of the components of the total anatomic hip prosthesis according to this invention;

Figure 2 shows on a greater scale the components of Figure 1, assembled and inserted in the patient's hip;

Figure 3 shows a front view of the stirring component;

Figure 4 shows an enlarged and partially cross-sectional view of a variation concerning the prosthesis components which are insertable in the iliac fossa;

Figure 5 shows the components of Figure 4, partially inserted in the iliac fossa;

Figure 6 shows the components of Figure 5, totally inserted in the iliac fossa;

Figure 7 shows a plan view of the component according to the variation of Figure 4, apt to anchor itself in the iliac fossa.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0014] With a reference to Figure 1 and according to this invention, a preferred embodiment of the total anatomic hip prosthesis is consituted by a plurality of components, such as an acetabulum 10, a higher blind compensator 12, a cap 14, a stirrup 16, a lower passing compensator 18 and a tie 20.

[0015] The particular, characterising structure of the aforesaid components is described in the following.

[0016] The prosthetic acetabulum 10 has a fundamentally hemispherical structure, hollow inside (10a)

and provided on its top with an opening or hole (10b) for technical and biological application purposes.

[0017] According to a feature of this invention, the acetabulum 10 includes on its external surface (10c) a series of harpoon-shaped teeth (10d), working as stabilizers, as well as some knurlings (10e). A pressure on said teeth (10d) produces a primary anchorage of the acetabulum 10 in the iliac fossa 22 (illustrated by a broken line in Figure 1), whereas the knurlings (10e) contribute to a better biological fusion between bone and implant.

[0018] Now, referring to the higher blind compensator 12, it is structured so as to include a head (12a) and a cylindrical part (12b), internally threaded (12c) for the purpose hereinbelow specified.

[0019] The cap 14, which is insertable in the cavity (10a) of the acetabulum 10 (Figure 1), has a similar hemispherical structure and is hollow inside (14a); on its top there is a seat (14b) with a central opening or hole (14c); this seat (14b) is foreseen to house the head (12a) of the higher blind compensator 12.

[0020] The aforesaid cap 14 advantageously has on its external surface (14d) a plurality of holes (14e) as well as circular rises (14f); these latter reduce the friction with the internal cavity (10a) of the acetabulum 10 in order to get the maximum sliding and the minimum dissipation of mechanical power, even with high radial loads, whereas the above mentioned plurality of holes (14e) allows an equitable distribution of the synovial liquid between the two surfaces on sliding phase.

[0021] The above circular rises (14f) could be replaced on the external surface (14d) of the cap 14 by radial grains, by segments having a hemisperical or a different shape, by sliding blocks and/or by other mechanical means suitable to the above purposes.

[0022] The above mentioned cap 14 includes, also advantageously, a notching (14g) placed on its own reference plane, which contributes to constrain said cap to the femoral head 24 illustrated with a broken line in Figure 1.

[0023] Furthermore, said cap 14 has in its cavity (14a) a particular alveolate structure (14h) apt to guarantee, after the surgical operation for the removal of the pathological tissues, the restoring osteogenesis, the following skeletal and mineral homeostasis as well as the trophism of the underlying bone structure.

[0024] The purpose of the cap 14 which replaces the removed pathological tissue is also to satisfy by means of its convexity the static and dynamic and tribological needs, and by means of its concavity to operate in continuous symbiosis with the bone trabecular base.

[0025] With regard to the stirrup 16 (Figures 1, 2 and 3), it has a structural C-shape which reproduces the shape of the lateral and external cortex of the femur under the great trochanter and includes on its larger surface (16a) a niche (16b) with an oblong and central opening (16c); said niche (16b) is apt to house the lower passing compensator 18 and the head (20b) of the tie 20.

[0026] Said lower passing compensator 18 has a flat side (18a) and a convex side (18b) and it is crossed by a hole (18c) for the passage of the tie 20.

[0027] As shown in Figure 2, the tie 20 is positioned in correspondance of the axis of the femoral head and neck 24, which is tilted of about 120°-160° with reference to the gravitational axis: the angle between the axis of the femoral head and neck 24 and the gravitational one (which can vary into a range of about 40°) and, as a consequence, the angle between the axis of the femoral head and neck 24 and the external cortex of the femur under the great trochanter (to which the stirrup 16 is applied) are different from person to person and are therefore specific geometrical characteristics of the femur of each person.

[0028] The convex side (18b) of the lower passing compensator 18 [which rotates into the nice (16b) of the stirrup 16] and the central oblong opening (16c) of the niche (16b) of the stirrup 16 allow the tie 20 to rotate (together with the lower passing compensator 18) with reference to the stirrup 16 to modify the angle between the axis of the femoral head and neck 24 and the stirrup 16, adapting the prosthesis to the specific geometrical characteristics of the patient's femur.

[0029] Said tie 20 is composed by a cylindrical part (20a), whose end is provided with a head (20b), whereas the other end has a cylindrical threaded part (20c) apt to be screwed in the higher blind compensator 12.

According to this invention the application of said prosthesis, used for patients with pathologies requiring the removal of the femoral head 24, implies a simplified process which is summarized hereinafter.

[0030] Starting from the resection of the hip joint capsule and from the luxation of the hip, excluding the femoral head 24 and femoral neck osteotomy, the next step is the exposition of the iliac fossa 22.

[0031] The bore of the iliac fossa 22 is carried out by means of some calibrated osteotribes of increasing diameter, so that the cartilage is completely removed till showing the underlying bone.

[0032] Several dimension checks must be carried out before the last osteotribing, which must be carefully executed by hand in order to preserve the edges of the iliac fossa 22.

[0033] By boring the iliac cotyloid cavity 22 the dimensions of the selected prosthetic acetabulum 10 must be considered; in fact, the mechanical element 10 for the primary anchorage to the basic bone structure must have a diameter at least 10 mm bigger than the diameter of the last osteotribe which operated on the iliac cotyloid cavity 22.

[0034] The acetabulum prosthesis 10 consisting of teeth (10d) and knurlings (10e), in order to favour a prompt biological fusion between bone and implant, in so far as the conditions of interfacial tissue adhering to said prosthesis allow, has to be inserted by pressure in the iliac fossa 22 where it anchors itself.

[0035] There is also a second acetabulum prosthesis 10' (Figure 4) which has a stabilizing ring 30 for the anchorage, wherein said stabilizing ring 30 has to be placed close to the "labrum acetabulare" at the end of the iliac cotyloid cavity 22 borings, as above described.

[0036] The stabilizing ring 30 autonomously expands because it includes a junction (30e) and is made of a "shape-memory" material and anchors itself on the position pre-arranged by the operator; it fits in the bone tissues by means of hooks (30a) and alike in order to enable the acetabulum prosthesis 10' to anchor itself to the above mentioned ring 30 by rotation.

[0037] Once decided the alignment by means of the suitable "collimator", the concerned bone structure is bored starting from the top of the head 24, then through the centre of the femoral head and, obliquely, through the whole higher epiphysis 26 till reaching the end of the diaphysis under the great trochanter.

[0038] The upper half of the femoral head 24 is decorticated by means of a cap toll according to the norms ruling the application of this prosthesis.

[0039] Once the decortication is completed, the cap 14 is held to the femoral head 24 through the higher blind compensator 12 [which is threaded inside (12c) and is provided with a head (12a)], the stirrup 16, the lower passing compensator 18 and the tie 20.

[0040] Said components (12, 14, 16 and 18) are placed by the following order: the cap 14 is placed on the decorticated head 24, the higher blind compensator 12 is placed in the suitable depression (14b) of the cap 14 and the stirrup 16 with the lower passing compensator 18 is housed under the great trochanter.

[0041] The tie 20 is inserted in the lower passing compensator 18 and in said stirrup 16, crosses the higher epiphysis 26 and the femoral head and neck 24 and is screwed to the higher blind compensator 12 placed on the cap 14, assemblying by pressure all the above mentioned components.

[0042] With special reference to Figures 4, 5, 6 and 7, said Figures show a structural variant of the only components which are insertable in the iliac fossa 22 because the others are similar to the above mentioned ones.

[0043] One of the components is constituted by a stabilizing ring 30 of mainly oval section which is provided with hooks (30a) or alike arranged on the external convexity (30b) of said ring 30 which thus may be inserted and linked to the iliac fossa 22 near the "labrum acetabulare".

[0044] As hereinafter described, a second component like the prosthetic acetabulum 10' can be linked to the ring 30, wherein said second component has a shape quite similar to the prosthetic acetabulum 10; it lacks teeth (10d) and knurlings (10e) but includes radial projections (10'a) apt to allow the link with said ring 30. For this purpose this latter has some cavities (30c) with inclined planes (30d) which are radially placed in its interior and are as many as the above mentioned radial projections (10'a) of said acetabulum 10'.

[0045] The above mentioned link occurs by inserting first the ring 30 in the iliac fossa 22 near the "labrum acetabulare", making sure that the hooks (30a) have a steady setting, then inserting the radial projections (10'a) in the cavities (30c; Figure 5) until they come out, helped by the inclined planes (30d; Figure 7); then the acetabulum 10' rotates on its axis till the aforesaid radial projections (10'a) are no longer aligned with said cavities (30c).

[0046] The stabilizing ring 30 is advantageously made of a "shape-memory" material for application purposes.

[0047] Finally, according to this invention, all total anatomic hip prosthesis components are made of a defined "inert" material and are therefore greatly biocompatible.

[0048] From the above said and according to this invention, it is evident that the prosthesis, which was realized thanks to innovatory ideas and with characteristics in accordance with the receiver's needs and physiological structures, as well as with the technological aspects of metallurgy and, above all, with the laws of mechanics in general, with a special regard for statics, dynamics and tribology, intends to solve the following problems:

1) to avoid the occupation of the diaphyseal duct with "power arm" or the rod of the current prostheses, the relevant cementation and all other implant pathological phenomena like this micro- and macromovements which are linked to the morphological and functional features of the mechanical system which was made in accordance with the lever principle;

2) to get a correct balance and an equitable distribution of the statical and dynamical forces which operate on the patient's bone structure;

3) to maintain the sphericity of the iliac cotyloid cavity and to give more stability to the prosthesis acetabulum which with usual prostheses was subjected to oscillatory movements, vibrations and glarings due to the profiles of these hip prostheses which influenced the radially operating forces;

4) to get rid of every type of fitting whose inevitable micro fragmentation, besides annihilating the specific lubricant and dampening function, provokes relevant injuries to the patient's health;

5) to limit the surgical operation to the removal of pathological, soft (fibrous sleeve, ligaments, etc.) and skeletal tissues which constitute the coxofemoral articulation and to safeguard in the concerned anatomic zone the haemopoietic function as well as the skeletal homeostasis and mineral homeostasis (phosphocalcium-metabolism) phenomena;

6) to exclude the use of metals which provoke allergies or electrical or magnetic phenomena causing degenerative illnesses for their toxicity;

7) to share uniformly the radial loads on the surface

of adhesion during the relative motion (sliding);
8) to preclude phenomena of dynamic instability;
9) to replace the "double curving" with innovatory and technical contrivances which, because of the reduced direct contact between the operating surfaces, minimize the "sliding friction resistance";
10) to share equitably the available flowing substance (synovial liquid = 3,0 ml) on the surfaces with direct contact and with "limit or epilaminic friction";
11) to get, with great radial loads, a maximum sliding, a minimum dispersion of mechanical power because of friction and large movements in all directions.

[0049] Finally, it is clear that modifications on the prosthesis according to the invention can be carried by the skilled in the art without departing from the scope of the following claims.

Claims

1. Total anatomic hip prosthesis, for patients who do not need the femoral head removal, **characterized by** including a hemispherical prosthetic acetabulum (10) standing above a hemispherical cap (14) and said cap (14), both provided with anchorage means fitting by pressure said acetabulum (10) in the iliac fossa (22) and, respectively, said cap (14) on said femoral head (24), said cap (14) being connected with components (12, 16, 18 and 20) which hold it stably on the above mentioned femoral head (24).

2. A prosthesis according to claim 1 wherein said anchorage means of said hemispherical acetabulum (10) in said iliac fossa (22) consist of a plurality of stabilizing harpoon-shaped teeth (10d) arranged on the external surface (10c) of said acetabulum (10) and wherein on said external surface (10c) there are knurlings (10e) which contribute to a biological anchorage of said acetabulum (10) in said iliac fossa (22).

3. A prosthesis according to claim 2, wherein the top of said prosthetic acetabulum (10) has a control opening or hole (10b) for technical and biological application purposes.

4. A prosthesis according to claim 1, wherein said anchorage means of said cap (14) with said femoral head (24) consists of a notching (14g) placed on the reference plane of said cap (14).

5. A prosthesis according to claim 4, wherein inside (14a) said cap (14) there is an alveolate structure (14h) with holes (14e) which communicate with the external surface (14d) of said cap (14).

6. A prosthesis according to claim 4, wherein said external surface (14d) of said cap (14) has round projections (14f) apt to reduce the friction with the inner surface (10a) of the above standing acetabulum (10).

7. A prosthesis according to claim 4, wherein said external surface (14d) of said cap (14) has radial grains, segments having a hemisperical or a different shape or sliding blocks apt to reduce the friction with the inner surface (10a) of the above standing acetabulum (10).

8. A prosthesis according to claim 4, wherein on the top of said cap (14) there is a seat (14b) with a central opening or hole (14c).

9. A prosthesis according to claim 1, wherein said anchorage means of said acetabulum (10') in said iliac fossa (22) are constituted by a stabilizing ring (30) which includes a junction (30e) and which is provided on the external circumference (30b) with hooks (30a) and wherein said stabilizing ring (30) is connectable to said acetabulum (10').

10. A prosthesis according to claim 9, wherein said stabilized ring (30) includes cavities (30c) with an inclined plane (30d) placed on the inner surface of said ring (30) and which allow the fitting and the passage of radial projections (10'a) on the external surface of said acetabulum (10') which, rotating, connect said stabilized ring (30) to said acetabulum (10').

11. A prosthesis according to claim 9, wherein said stabilizing ring (30) is made of a "shape-memorizing" material.

12. A prosthesis according to claim 1, wherein said components holding said cap (14) on said femoral head (24) include a higher blind compensator (12) which is threaded inside (12c) and is provided with a head (12a), a stirrup (16), a lower passing compensator (18) and a tie (20).

13. A prosthesis according to claim 12, wherein said tie (20) is provided with a head (20b) on a first end and a threading (20c) on the opposite end.

14. A prosthesis according to claims 12 and 13, wherein said stirrup (16) has a structural C-shape reproducing the shape of the external and lateral cortex of the femur under the great trochanter and wherein said stirrup (16) is provided with a niche (16b) with a central and oblong opening (16c) apt to house said lower passing compensator (18), having a flat side (18a) and a convex side (18b), and said head (20b) of said tie (20).

15. A prosthesis according to claims 8 and 12, wherein said tie (20) is to be inserted in said lower passing compensator (18), then in said stirrup (16) and, by penetrating from the top of the diaphysis under the great trochanter, it is to be passed obliquely through the whole higher epiphysis (26) and through the centre of the femoral neck (24) and head in order to be screwed to said higher blind compensator (12), whose head (12a) is to be placed in said seat (14b) of said cap (14) to constrain all.

16. A prosthesis according to claims 12 and 14, wherein said convex side (18b) of said lower passing compensator (18) and said central oblong opening (16c) of said niche (16b) of said stirrup (16) allow said tie (20) to rotate together with said lower passing compensator (18) with reference to said stirrup (16) to adapt said prosthesis to the specific geometrical characteristics of the patient's femur.

17. A prosthesis according to the previous claims, wherein all components of said prosthesis are made of a defined "inert", highly biocompatible material.

Patentansprüche

1. Vollständige anatomische Hüftprothese für Patienten, welche keine Entfernung des Femoralkopfs benötigen, **dadurch gekennzeichnet, daß** diese ein halbkugelförmiges prothetisches Azetabulum (10), welches auf einer halbkugelförmigen Kappe (14) ruht, und die Kappe (14) umfaßt, welche beide mit einer Verankerungseinrichtung versehen sind, durch welche das Azetabulum (10) durch Druck in der Fossa iliaca (22) bzw. die Kappe (14) auf dem Femoralkopf (24) angebracht wird, wobei die Kappe (14) mit Bauelementen (12, 16, 18 und 20) verbunden ist, welche diese stabil auf dem oben erwähnten Femoralkopf (24) halten.

2. Prothese nach Anspruch 1, wobei die Verankerungseinrichtung des halbkugelförmigen Azetabulums (10) in der Fossa iliaca (22) aus einer Vielzahl stabilisierender harpunenförmiger Zähne (10d), welche auf der äußeren Oberfläche (10c) des Azetabulums (10) angeordnet sind, besteht und wobei die äußere Oberfläche (10c) Rändelungen (10e) aufweist, welche zu einer biologischen Verankerung des Azetabulums (10) in der Fossa iliaca (22) beitragen.

3. Prothese nach Anspruch 2, wobei die Oberseite des prothetischen Azetabulums (10) eine Steueröffnung bzw. ein Steuerloch (10b) für Zwecke technischer und biologischer Anwendungen aufweist.

4. Prothese nach Anspruch 1, wobei die Verankerungseinrichtung der Kappe (14) und des Femoralkopfs (24) aus einer Einkerbung (14g), welche in der Bezugsebene der Kappe (14) angeordnet ist, besteht.

5. Prothese nach Anspruch 4, wobei sich innerhalb (14a) der Kappe (14) eine alveoläre Struktur (14h) mit Löchern (14e), welche mit der äußeren Oberfläche (14d) der Kappe verbunden sind, befindet.

6. Prothese nach Anspruch 4, wobei die äußere Oberfläche (14d) der Kappe (14) runde Vorsprünge (14f) aufweist, welche geeignet sind, die Reibung des darauf ruhenden Azetabulums (10) an der inneren Oberfläche (10a) zu vermindern.

7. Prothese nach Anspruch 4, wobei die äußere Oberfläche (14d) der Kappe (14) eine radiale Körnung, Abschnitte mit einer halbkugelförmigen oder einer anderen Gestalt oder Gleitblöcke aufweist, welche geeignet sind, die Reibung an der inneren Oberfläche (10a) des darauf ruhenden Azetabulums (10) zu vermindern.

8. Prothese nach Anspruch 4, wobei sich an der Oberseite der Kappe (14) ein Sitz (14b) mit einer zentralen Öffnung bzw. einem Loch (14c) befindet.

9. Prothese nach Anspruch 4, wobei die Verankerungseinrichtung des Azetabulums (10') in der Fossa iliaca (22) durch einen Stabilisierring (30) gebildet wird, welcher eine Verbindung (30e) umfaßt und welcher an dem äußeren Umfang (30b) mit Haken (30a) versehen ist, wobei der Stabilisierring (30) mit dem Azetabulum (10') verbunden werden kann.

10. Prothese nach Anspruch 9, wobei der Stabilisierring (30) Hohlräume (30c) umfaßt, wobei eine geneigte Ebene (30d) an der inneren Oberfläche des Rings (30) angeordnet ist, welche das Einpassen und den Durchgang radialer Vorsprünge (10a') auf der äußeren Oberfläche des Azetabulums (10') ermöglichen, welche in Drehung den Stabilisierring (30) mit dem Azetabulum (10') verbinden.

11. Prothese nach Anspruch 9, wobei der Stabilisierring (30) aus einem Material mit "Formgedächtnis" hergestellt ist.

12. Prothese nach Anspruch 1, wobei die Bauelemente, welche die Kappe (14) auf dem Femoralkopf (24) halten, einen oberen Blindkompensator (12) umfassen, welcher innen (12c) mit einem Gewinde versehen ist und mit einem Kopf (12a), einem Bügel (16), einem unteren Durchgangskompensator (18) und einem Verbindungsstück (20) versehen ist.

13. Prothese nach Anspruch 12, wobei das Verbindungsstück (20) mit einem Kopf (20b) an einem ersten Ende und einem Gewinde (20c) an dem gegenüberliegenden Ende versehen ist.

14. Prothese nach Anspruch 12 und 13, wobei der Bügel (16) eine strukturelle C-Gestalt aufweist, welche die Gestalt des äußeren und seitlichen Cortex des Femurs unter dem großen Trochanter wiedergibt, und wobei der Bügel (16) mit einer Nische (16b) mit einer zentralen und länglichen Öffnung (16c) versehen ist, welche geeignet ist, den unteren Durchgangskompensator (18), welcher eine flache Seite (18a) und eine konvexe Seite (18b) aufweist, und den Kopf des Verbindungsstücks (20) aufzunehmen.

15. Prothese nach Anspruch 8 und 12, wobei das Verbindungsstück (20) in den unteren Durchgangskompensator (18) einzuführen ist, dann in den Bügel (16) und durch Eindringen von der Oberseite der Diaphyse unter dem großen Trochanter schräg durch die gesamte obere Epiphyse (26) und durch die Mitte des Femoralhalses (24) und den Kopf zu führen ist, um an den oberen Blindkompensator (12) geschraubt zu werden, dessen Kopf (12a) in dem Sitz (14b) der Kappe (14) anzuordnen ist, um alles zu halten.

16. Prothese nach Anspruch 12 und 14, wobei es die konvexe Seite (18b) des unteren Durchgangskompensators (18) und die zentrale längliche Öffnung (16c) der Nische (16b) des Bügels (16) ermöglichen, daß sich das Verbindungsstück (20) gemeinsam mit dem unteren Durchgangskompensator (18) gegen den Bügel (16) dreht, um die Prothese an die speziellen geometrischen Merkmale des Femurs des Patienten anzupassen.

17. Prothese nach den vorangehenden Ansprüchen, wobei sämtliche Bauelemente der Prothese aus einem definierten "inerten", hochgradig biokompatiblen Material hergestellt sind.

Revendications

1. Prothèse totale et anatomique de la hanche destinée à des patients pour lesquels le retrait de la tête du fémur n'est pas nécessaire, **caractérisée en ce que** qu'elle comprend un acétabulum prothétique hémisphérique (10) se trouvant au-dessus d'une coiffe hémisphérique (14) et ladite coiffe (14), tous deux étant munis de moyens d'ancrage fixés par pression dudit acétabulum (10) dans la fosse iliaque (22) et, respectivement, de ladite coiffe (14) sur ladite tête du fémur (24), ladite coiffe (14) étant reliée à des composants (12, 16, 18 et 20) qui la maintiennent stable sur la tête du fémur susmentionnée (24).

2. Prothèse selon la revendication 1, dans laquelle lesdits moyens d'ancrage dudit acétabulum hémisphérique (10) dans ladite fosse iliaque (22) se composent d'une pluralité de dents de stabilisation en forme de harpon (10d) disposées sur la surface extérieure (10c) dudit acétabulum (10) et dans laquelle, sur ladite surface extérieure (10c), se trouvent des moletages (10e) qui contribuent à l'ancrage biologique dudit acétabulum (10) dans ladite fosse iliaque (22).

3. Prothèse selon la revendication 2, dans laquelle le sommet dudit acétabulum prothétique (10) présente un trou ou une ouverture de contrôle (10b) destiné(e) à des fins d'application technique et biologique.

4. Prothèse selon la revendication 1, dans laquelle lesdits moyens d'ancrage de ladite coiffe (14) à ladite tête du fémur (24) se composent d'une encoche (14g) placée sur le plan de référence de ladite coiffe (14).

5. Prothèse selon la revendication 4, dans laquelle, à l'intérieur (14a) de ladite coiffe (14), se trouve une structure alvéolée (14h) avec des trous (14e) qui communiquent avec la surface extérieure (14d) de ladite coiffe (14).

6. Prothèse selon la revendication 4, dans laquelle ladite surface extérieure (14d) de ladite coiffe (14) présente des saillies rondes (14f) capables de réduire le frottement avec la surface intérieure (10a) de l'acétabulum situé au-dessus (10).

7. Prothèse selon la revendication 4, dans laquelle ladite surface extérieure (14d) de ladite coiffe (14) présente des segments radiaux en grains ayant une forme hémisphérique ou autre ou des blocs coulissants capables de réduire le frottement avec la surface intérieure (10a) de l'acétabulum situé au-dessus (10).

8. Prothèse selon la revendication 4, dans laquelle, sur le sommet de ladite coiffe (14), se trouve un support (14b) avec un trou ou une ouverture central(e) (14c).

9. Prothèse selon la revendication 1, dans laquelle lesdits moyens d'ancrage dudit acétabulum (10') dans ladite fosse iliaque (22) se composent d'un anneau de stabilisation (30) qui comprend une jonction (30e) et qui est muni, sur la circonférence extérieure (30b), de crochets (30a) et dans laquelle ledit anneau de stabilisation (30) peut être relié

audit acétabulum (10').

10. Prothèse selon la revendication 9, dans laquelle ledit anneau stabilisé (30) comprend des cavités (30c) avec un plan incliné (30d) placées sur la surface intérieure dudit anneau (30) et qui permettent l'insertion et le passage de saillies radiales (10'a) sur la surface extérieure dudit acétabulum (10') qui, en pivotant, relient ledit anneau stabilisé (30) audit acétabulum (10').

11. Prothèse selon la revendication 9, dans laquelle ledit anneau de stabilisation (30) est fabriqué à partir d'un matériau à « mémorisation de forme ».

12. Prothèse selon la revendication 1, dans laquelle lesdits composants maintenant ladite coiffe (14) sur ladite tête du fémur (24) comprennent un compensateur borgne supérieur (12) qui est fileté à l'intérieur (12c) et est muni d'une tête (12a), d'un étrier (16), d'un compensateur de passage inférieur (18) et d'une attache (20).

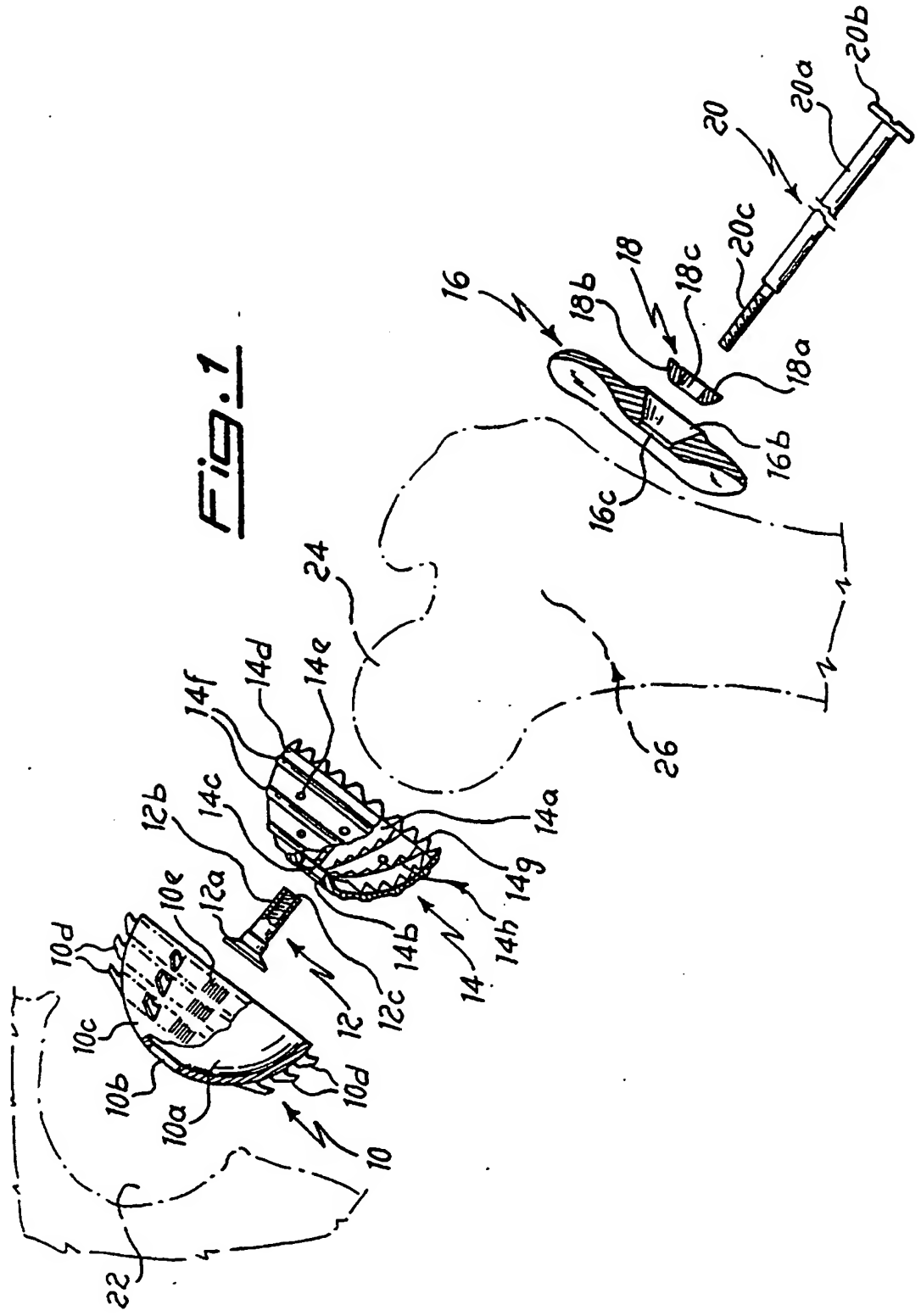
13. Prothèse selon la revendication 12, dans laquelle ladite attache (20) est munie d'une tête (20b) sur une première extrémité et d'un filetage (20c) sur l'extrémité opposée.

14. Prothèse selon les revendications 12 et 13, dans laquelle ledit étrier (16) présente une forme structurelle en C reproduisant la forme du cortex latéral et extérieur du fémur sous le grand trochanter et dans laquelle ledit étrier (16) est muni d'une niche (16b) avec une ouverture centrale et oblongue (16c) capable de renfermer ledit compensateur de passage inférieur (18), ayant un côté plat (18a) et un côté convexe (18b), et de ladite tête (20b) de ladite attache (20).

15. Prothèse selon les revendications 8 et 12, dans laquelle ladite attache (20) doit être insérée dans ledit compensateur de passage inférieur (18), puis dans ledit étrier (16) et, en pénétrant depuis le sommet de la diaphyse sous le grand trochanter, doit être passée de manière oblique à travers toute l'épiphyse supérieure (26) et à travers le centre du col du fémur (24) et la tête afin d'être vissée audit compensateur borgne supérieur (12), dont la tête (12a) doit être placée dans ledit appui (14b) de ladite coiffe (14) pour forcer l'ensemble.

16. Prothèse selon les revendications 12 et 14, dans laquelle ledit côté convexe (18b) dudit compensateur de passage inférieur (18) et ladite ouverture oblongue centrale (16c) de ladite niche (16b) dudit étrier (16) permettent à ladite attache (20) de pivoter conjointement avec ledit compensateur de passage inférieur (18) par rapport audit étrier (16) de manière à adapter ladite prothèse aux caractéristiques géométriques spécifiques du fémur du patient.

17. Prothèse selon l'une quelconque des revendications précédentes, dans laquelle tous les composants de ladite prothèse sont fabriqués à partir d'un matériau extrêmement biocompatible défini comme étant « inerte ».


10
10a
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10c
10d
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26

Fig.1

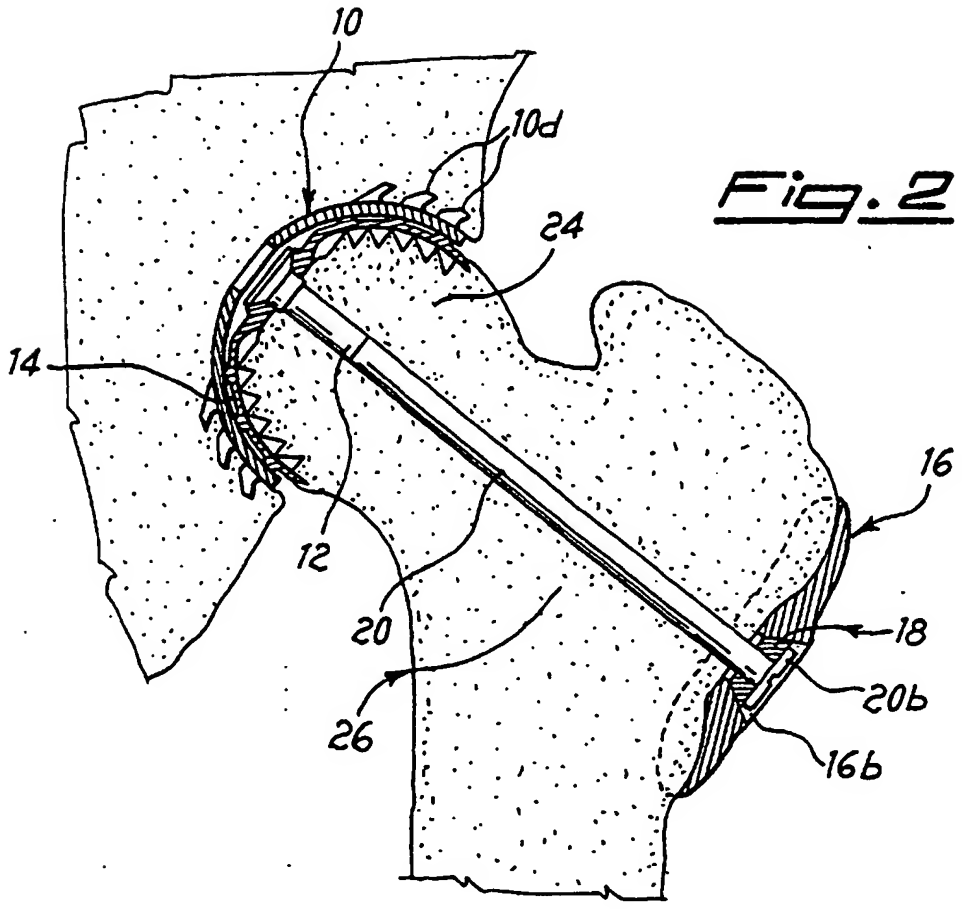


Fig.2

Fig.3

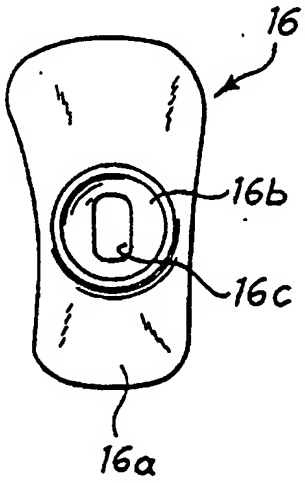
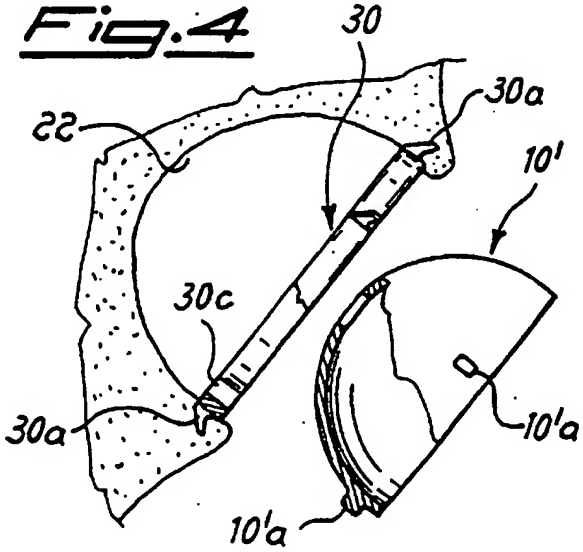


Fig.4



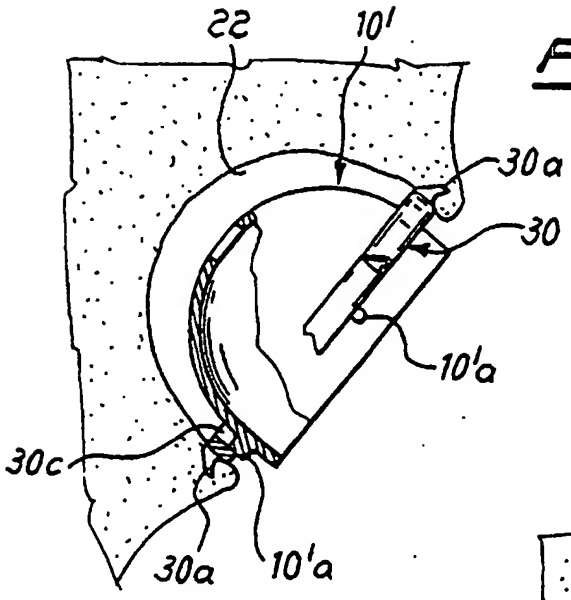


Fig.5

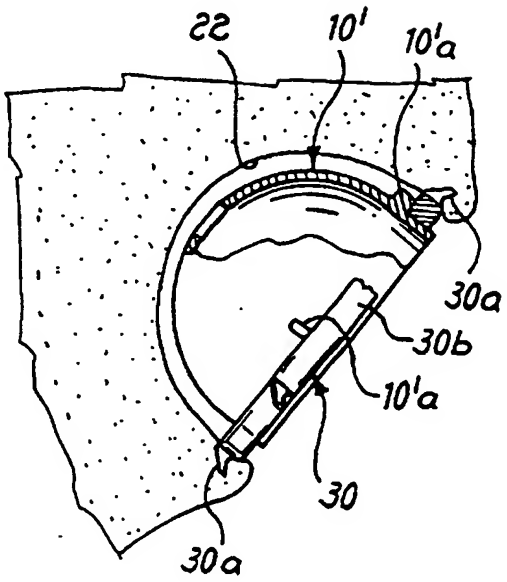


Fig.6

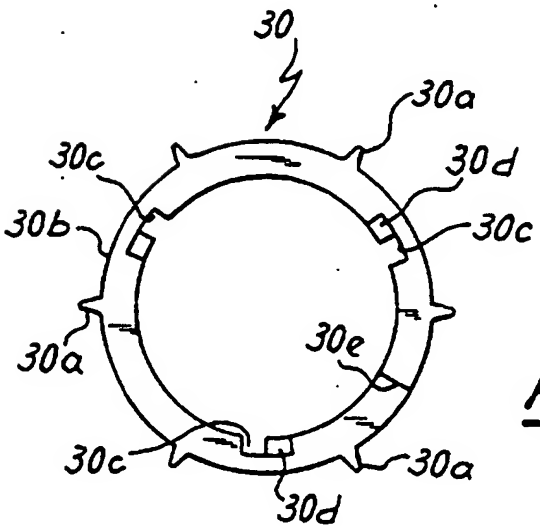


Fig.7